

### REMARKS

In response to Applicant's arguments, the examiner states that: "... Applicants reiterated the Examiner's grounds of rejection in their remarks, which clearly contains every limitation that applicants allege is not present. Therefore since the grounds of rejection more than adequately addresses the majority of applicants' arguments the arguments are not persuasive for reasons already made of record."

Applicant contends that merely because Applicant has repeated the examiner's grounds, does not imply that the features based on those grounds are in fact present in the reference. Indeed, the point of repeating the examiner's grounds followed by Applicant's argument is to show that the features are indeed not present, but rather a misconstruction and thus improper modification of Hockaday in the context of an anticipation rejection.

#### 35 U.S.C § 102

The examiner maintained the rejection of Claims 1, 2 and 5-10 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,645,651 (Hockaday).

Claim 1 as now amended, calls for "A fuel cartridge ... comprising a housing, a fuel egress port connected to the housing ... and a surface area enhanced ... vaporization membrane disposed in the housing of the fuel cartridge."

The examiner argues that: "Hockaday teaches a fuel cartridge comprising a housing 7 with a fuel egress 4 (i.e. exit port) supported by and coupled to the housing (figures 1 and 2, column 3, lines 55-64, column 5, line 1 - column 6, line 59, column 7, lines 49-50 and column 8, line 24 - column 9, line 40)." Applicant disagrees. Hockaday '045 neither describes nor suggests that the cartridge has a fuel egress port coupled to the housing.

However, in order to advance prosecution, Applicant has amended claim 1 to call for "a fuel egress port connected to the housing, and clarified that the membrane is in the housing of the fuel cartridge."

The examiner also argues that:

Hockaday further incorporates the fuel Ampoule of the commonly assigned U.S. Pre-Grant Publication No. 2001/0049045 by reference and that U.S. Patent No. 6,645,651 is an improvement upon said fuel ampoule by adding an additional fuel source inside of a fuel cartridge to the previously known fuel ampoule," the previous fuel ampoule of U.S. Pre-Grant Publication No. 2001/0049045 is disclosed as having

the following structure; a multilayer composite vaporization membrane 8 and 9, having a cylindrical shape (figures 1 and 3), disposed about a substantial portion of an interior of the housing, that has a selective permeability to allow vaporization of liquid methanol (paragraph [0052]) (i.e. as recited in claim 5) said cartridge also containing a carbonaceous compound (paragraph [0023]), said membrane comprising silicone or silicone impregnated into fiberglass cloth or polyester film, said membrane further comprising a porous substrate made of polyurethane (paragraph [0050]) (see also paragraphs [0014]-[0056]).

In addition, in order to advance prosecution, Applicant has amended claim 1 to call for "a ... membrane ... in the housing of the fuel cartridge."

The examiner considers that this feature is taught by Hockaday 045' "2001/0049045 is disclosed as having the following structure; a multilayer composite vaporization membrane 8 and 9." Applicant disagrees. Items 8 and 9 in FIGS. 1 and 2 are the walls of the ampoule<sup>1</sup>, not a surface area enhanced planar vaporization membrane that resides in the housing of the fuel cartridge.

The examiner also argues that: "and that U.S. Patent No. 6,645,651 is an improvement upon said fuel ampoule by adding an additional fuel source inside of a fuel cartridge to the previously known fuel ampoule."

Hockaday '651, discloses: "A system of two fuel ampoules that can deliver a reactant by diffusion through one of the ampoule walls to the other, such that when said reactant enters the second ampoule, it reacts with another reactant in said second ampoule, making hydrogen gas as a product. Both ampoules are stored in a fuel impermeable container."<sup>2</sup>

Hockaday therefore also fails to disclose the features of a fuel cartridge that includes ... a surface area enhanced vaporization membrane residing in the housing of the fuel cartridge.

In response to Applicant's arguments, the examiner stated: "Regarding claim 1, with respect to the membrane applicants ignore the disclosure in column 9 that the ampoule walls 8 and 12 are made out of selectively permeable silicon rubber." Applicant however points out that the claimed features of the cartridge are: a housing, a fuel egress port connected to the housing ... and a surface area enhanced vaporization membrane in the housing.

In contrast, the construction described and suggested by Hockaday is a fuel ampoule having walls made of selectively permeable silicon rubber. That arrangement however is not what is claimed in Applicant's claim 1 because Hockaday does not have a cartridge comprising a housing, an egress port connected to the housing and a surface area enhanced vaporization membrane in the housing.

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<sup>1</sup> Hockaday discloses that: "The ampoule wall 8, 9 may be constructed from pure silicone rubber." Hockaday paragraph [0050].

<sup>2</sup> Hockaday '651 Abstract.

Accordingly, the alleged combination of Hockaday 651 and the incorporated by reference teachings in Hockaday '045 neither describes nor suggests claim 1.

### Claim 2

Claim 2 calls for the surface area enhanced planar vaporization membrane being a polymer membrane that is disposed about a substantial portion of an interior of the housing to provide a high surface area membrane.

In response to Applicant's prior argument the examiner stated:

Regarding claim 2, silicone rubber as defined by Dow Corning (<http://www.dowcorning.com/content/rubber/silicone-rubber.asp>) is a polymer: What is silicone rubber? Silicone rubber is a unique synthetic elastomer made from a cross-linked polymer which is reinforced with silica. Its characteristics are such that it provides the perfect balance of mechanical and chemical properties required by many of today's most demanding applications.

Applicant does not understand the relationship of this argument to the structural distinctions pointed out for Claim 2. Merely by the examiner reciting properties of silicone rubber does not address the structural relationship of the surface area enhanced planar vaporization membrane ... disposed about a substantial portion of an interior of the housing, as in Claim 2.

In contrast, Hockaday '045 teaches items 8 and 9 respectively, as a porous fiberglass wall that is coated with silicone rubber. Alternatively, according to Hockaday '045 both 8 and 9 can be silicone rubber. Apparently, the examiner misconstrues items 8 and 9 as the surface area enhanced planar vaporization membrane. Applicant contends that the only logically reading of Hockaday '045 is as Hockaday discloses items 8 and 9 as walls of an ampoule. The walls are designed to allow fuel to enter the fuel cell, and therefore Hockaday has no need nor does Hockaday supply any motivation to provide: "a polymer membrane that is disposed about a substantial portion of an interior of the housing to provide a high surface area membrane."

Note that in Hockaday '651 there would not exist "a polymer membrane that is disposed about a substantial portion of an interior of the housing to provide a high surface area membrane.", as called for in claim 2, but rather there would exist two ampoule walls inside of the generator. This however does not identically disclose the subject matter of claim 2.

Claims 5-9 further limit claim 1 and are allowable at least for the reasons discussed in claim 1.

#### Claim 10

Claim 10 recites that the fuel cartridge of claim 1 has the surface area enhanced planar vaporization membrane enhance "a delivery rate of methanol in a vapor phase to the egress port for a given cartridge size."

In response to Applicant's prior reply, the examiner argues that: "Regarding claim 10 since Hockaday discloses a selectively permeable membrane it is fully capable of the function of claim 10." Applicant contends that this reasoning misses the point of claim 10, to enhance "a delivery rate of methanol in a vapor phase to the egress port for a given cartridge size." This is an anticipation rejection. Arguments that fail to address the egress port cannot be used to sustain such a rejection merely because the examiner alleges that Hockaday discloses a membrane that is "fully capable." Hockaday '045 does not describe the fuel egress port and hence cannot describe that "the surface area enhanced planar vaporization membrane enhances a delivery rate of methanol in a vapor phase to the egress port for a given cartridge size."

While Hockaday '651 may disclose the fuel egress port, there is no teaching in either Hockaday '651 or '045 that the surface area enhanced planar vaporization membrane enhances "a delivery rate of methanol in a vapor phase to the egress port for a given cartridge size.", because that is not the function disclosed by Hockaday '045 for the walls of the ampoules.

Therefore, Hockaday '651 has no need to nor does Hockaday '045 or '651 supply any motivation to modify the disclosed fuel ampoule to provide the claimed enhancement of delivery rate to the fuel egress port. The examiner has not made out a *prima facie* case of anticipation because Hockaday '651, albeit with incorporation of Hockaday '045, fails to identically disclose the claimed subject matter.

#### 35 U.S.C § 103

The examiner rejected Claims 3, 11-20, 22-30, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hockaday in view of U.S. Patent No. 5,069,793 (Kaschemekat).

The examiner is referred to the office action for the text of the rejections.

Claim 3 calls for the feature that the "surface area enhanced planar vaporization membrane is a composite membrane comprised of multiple layers of polymer membrane to increase vapor permeation surface area."

These claims which are all directed to aspects of the enhanced planar vaporization membrane, e.g., as "a composite membrane comprised of multiple layers of polymer membrane to increase vapor permeation surface area," (claim 3), further distinguish Applicant's invention over the combination of references.

The examiner uses Kaschemekat to teach: "... a spirally wound multi layer composite membrane comprising a porous substrate (i.e. web), a membrane disposed on a first surface of the substrate (i.e., microporous substrate membrane) and a coating that is a permselective polymer on the other surface of the substrate and said multi layer composite membrane can be a plurality of membranes (column 1, lines 11-52, column 10, lines 33-64 and example 1). ... "

The examiner also contends that it would have been obvious:

At the time of the invention it would have been obvious to one having ordinary skill in the art to form a multi layer composite membrane having a porous substrate with a membrane on one side and a methanol-impermeable coating on the opposite surface and then spirally wind said multi layer composite membrane in Hockaday as taught by Kaschemekat, in order to provide a fuel cartridge that will have a higher capacity for methanol storage and improved safety by limiting the amount of methanol that can be leaked out of the container if it should be punctured while at the same time allowing the right amount of fuel through the fuel egress for supply to a fuel cell. It would have also been obvious to provide multiple multi layer composite membrane in Hockaday as taught by Kaschemekat to further increase the capacity for methanol storage and improved safety of the fuel cartridge and also because it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. It would have also been obvious to use polyurethane for the membrane in Hockaday as taught by Kaschemekat in order to provide a membrane that is properly selected for its specific chemical selectivity and also since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

The examiner in reply addresses Applicant's argument as follows:

The remainder of applicants arguments stem from the fact that the secondary references do not make up for the supposed deficiencies of the primary reference. However the deficiencies that applicants are referring too have already been addressed either in the grounds of rejection or in the response to arguments above

and therefore the primary reference does not contain the deficiencies that applicants allege.

Applicant disagrees. Applicant has argued that there exist structural differences over the alleged combinations of references for several of the claims, e.g., 3, 4, 11, and 24. Moreover, merely because applicant has addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner; made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or amended or canceled a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

The examiner also responded to Applicant's argument regarding suggestion to combine.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the reasons to combine can be found in the motivation statements for combining references already provided to applicants in the grounds of rejection.

Applicant contends that this does not further expound upon the examiner's reasoning. However, Applicant believes that the motivation must fail because it is an exercise in *ex post* reasoning.

The motivation offered by the examiner "...to further increase the capacity for methanol storage and improved safety of the fuel cartridge." would not be provided by adding a membrane that would not increase the capacity of methanol storage (it occupies space and thus would reduce it). The other motivation proffered by the examiner, namely safety, is arguably thwarted by Hockaday which already offers a more effective safety mechanism than Kaschemekat, namely, open cell foam.<sup>3</sup>

Claim 11, directed to a fuel cartridge including a housing, a fuel egress port supported by the housing and a composite membrane residing in the housing of the fuel cartridge including a

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<sup>3</sup> Hockaday [0050]

porous substrate, a polymer membrane disposed over a first surface of the porous substrate and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate.

No combination of Hockaday in view of Kaschemekat discloses the combination of these features. It is noted that Hockaday would not have any use for composite membrane residing in the fuel cartridge, of the construction that would include "a porous substrate, a polymer membrane disposed over a first surface of the porous substrate and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate." Kaschemekat, which is directed to teaching of spiral wound membrane module, does not teach the structure of the composite membrane of claim 11. In addition, Kaschemekat does not otherwise cure the deficiencies in the alleged combination. Claim 11 is therefore also allowable.

Claims 12-23, which depend directly or indirectly from claim 11 are allowable at least for the reason that they depend from claim 11.

Claim 24 is allowable over the combination of references, since no combination suggests a composite membrane including a porous substrate, a polymer membrane ... and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate. No combination of the references suggests and a coating of a methanol-impermeable material disposed over an opposite surface of the substrate.

Claims 25-33 are allowable at least because they depend from claim 24.

The examiner rejected Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Hockaday in view of U.S. Patent No. 5,681,467 hereinafter Solie.

The examiner argued that:

Claim 4 requires that: "the surface area enhanced planar vaporization membrane is a membrane arranged as a series of folds." Solie taken with Hockaday neither describes nor suggests the features of the base claim and Solie does not cure the deficiencies in Hockaday.

While Solie teaches a method to form a membrane into a predetermined shape, Applicant contends that like Hockaday, Solie also does not teach that the membrane has a series of folds. Moreover, the combination of Hockaday with Solie, "in order to increase the overall surface area of the membrane to allow more methanol to be released and supplied to the fuel cell." is not suggested, at least because Hockaday is directed to a fuel ampoule not a cartridge and to modify

the elements 8 and 9 of Hockaday to provide them as a series of folds would appear to be unworkable or at the very least would require additional modifications of the fuel cell-ampoule arrangement, as taught by Hockaday, and which the examiner has not addressed.

Claims 21 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hockaday in view of Kaschemekat as applied to claims 11 and 24 above, and further in view of U.S. Patent No. 6,207,369 hereinafter Wohlstadter.

The examiner argues that:

Hockaday as modified by Kaschemekat does not teach that the membrane is a sintered metal coated with a polymer.

Wohlstadter teaches that filters may comprise sintered metals coated with polymer membranes (column 70, line 66 - column 71, line 4).

At the time of the invention it would have been obvious to one having ordinary skill in the art to include a sintered metal coated with a polymer as the membrane for Hockaday as modified by Kaschemekat as taught by Wohlstadter in order to increase the overall rigidity of the fuel cartridge thus making it more durable and also since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

As pointed out above, Hockaday, as modified by Kaschemekat, is not suggested and does not teach the features of the base claims and the addition of Wohlstadter also does not cure the deficiencies in the base combination.

#### Double Patenting

In response to applicant's argument the examiner stated: "The Double Patenting rejection arguments have already been addressed in the Non-Final office action dated 8/14/07 and will not be reiterated herein. For reasons established herein and already made of record the grounds of rejection will be maintained."

The examiner provisionally rejected Claims 1-8 and 10 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-6, 8 and 12 of co-pending Application No. 10/664,405.

Claim 1 from co-pending Application No. 10/664,405 requires "... a heat producing element disposed in thermal communication with an interior portion of the housing."

Claim 1 of the present application requires "... a surface area enhanced planar vaporization membrane residing in the fuel cartridge."



No unjustified or improper time-wise extension of the "right to exclude" would be granted by issuance of patents on each of the applications or harassment by multiple assignees<sup>4</sup> would result from this situation at least because claim 1 of the instant application and claim 1 of the co-pending application require respectively, different mechanisms "a surface area enhanced planar vaporization membrane residing in the fuel cartridge" and "a heat producing element disposed in thermal communication with an interior portion of the housing."

The examiner has not offered any reasoning or countervailing argument why these two mechanisms are not distinct.

The examiner provisionally rejected Claims 1-3, 5-8 and 10 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1, 2, 6-9, 11 and 12 of co-pending Application No. 10/664,818.

The examiner argued that: "Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of both applications just use different words to claim the same thing."

Applicant had previously argued:

Although claims 8-17 of the co-pending application recite "cartridge," those claims have been amended, by preliminary amendment filed in that case on the same day as this reply, to call for a "container," as recited in the base claim 1 and claims 2-7. In contrast, claims of the instant application are directed to a "cartridge." The conflicting claims are not identical and are patentably distinct from each other because the claims of both applications are directed to different items.

Nevertheless, applicant will consider filing of a terminal disclaimer in view of application '818, upon an indication of allowable subject matter.

Upon further consideration Applicant contends that this rejection is improper. The subject matter of the claims of the co-pending application all require that the housing have "at least a portion of a wall of the housing being comprised of a thermally conductive material." No such feature is recited in any of the claims of the instant application.

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<sup>4</sup> Examiner's Action page 7.

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Therefore, the subject matter of each case is directed to patentably distinct features and the rejection is improper and Applicant will maintain a clear line of demarcation among the applications.

This Reply is accompanied by a Request for Continued Examination and Petition for Extension of Time.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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